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SHORT COMMUNICATION

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The superiority of interactive courses combined with the teacher's physical presence in the undergraduate pathology curriculum

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ABSTRACT

Objective: Education in Pathology through the traditional way of teaching in undergraduate medical curriculum is steady, based on the teacher's physical presence and the theoretical context of teaching. Although modern methods, including web-assisted training, foster students' interest through experiential learning, the complementary role of such methods compared to traditional ones is appraised.

Methods: Three hundred questionnaires were given to the students of Pathology I (fifth undergraduate semester) and Pathology II (sixth undergraduate semester), respectively. Theoretical lectures, laboratory, clinicopathological courses, and exam preparatory courses were compared to modern web courses (HIstoPathology ONline platform and Open e-courses).

Results: Despite the overall low response rate, the evaluation of the undergraduate Pathology curriculum shows that education through interactive clinicopathological courses, by presenting case studies, is seen by students as particularly interesting when combined with the teacher's physical presence. Web/e-courses seem to be less attractive, indicating a possible reluctance in their wide use in the learning process within an academic curriculum.

Conclusion: At present, teaching with the tutor's physical presence is still considered to be superior, with e-tools regarded as complements; the combination of the traditional theory teaching with interactive courses emerges as the current education option by the students of pathology.

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KEYWORDS

Pathology education; web-assisted training; experiential learning

Introduction

Experiential learning is a process by which learners develop knowledge, skills, and values from direct experiences outside the traditional academic context. The result of experiential learning is that any theoretical, abstract, and 'inert' knowledge that learners memorize from traditional texts comes to life as they participate in the practical application of knowledge. In this way, participants develop relevant communication skills, confidence, and acquire and enhance decision-making skills [1].

Although the traditional way of teaching pathology to undergraduate medical students is fundamental and steady, the complementary role of alternative methods is appraised [2,3]. They include information technology or other team-based or problem-solving approaches, and contribute to the completion of education by maintaining the learner's interest. Innovations of this kind have been implemented in many universities around the world. At the First Department of Pathology, School of Medicine, National and Kapodistrian University of Athens (NKUA), two distinct educational methods have been implemented.

HistoPathology Online (HIPON) platform

This interactive training platform HIPON deals with general and systemic pathology. It offers virtual slides, cases studies, training videos, and image records, as well as self-assessment tests. The main features of this modern, web-based educational tool are guided presentations and case studies simulated to everyday practice that reflects high

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pedagogical experience, extensive high-resolution microscopic image collections, instructional videos, and digitized cases. The step-by-step diagnostic analysis is at the heart of this curriculum. The five partners of the program are from Athens, Zagreb, Nijmegen, Nicosia, and Skopje. The HIPON website (www.hiponproject.eu) is part of social networks and is available on the Android mobile application [1,2].

Open pathology video courses

In the portfolio of the e-class of NKUA, within the curriculum of undergraduate courses of Pathology in the fifth and sixth semesters, open access "live" video courses of Pathology are available. These courses cover both general pathology (neoplasia, inflammation, etc.) and systemic pathology (such as digestive tract, male genital system, patterns of glomerular renal injury, etc.). Clinical–pathologic correlations and discussions are made and the importance of pathological data in the diagnosis and therapeutic management of patients is highlighted. The purpose of this study is to evaluate the usefulness of the above-mentioned educational projects/tools by the undergraduate students of Athens Medical School, as well as to compare them with the conventional methods of teaching Pathology via a questionnaire-based approach.

Materials and Methods

Three hundred questionnaires were given to the undergraduate students of Athens Medical School of Pathology I and II in the fall (fifth) semester of December 2016 and the spring (sixth) semester of June 2017, respectively. It was a conscious effort, to the widest extent possible, to simply distribute the questionnaires without encouraging students to complete them. Participation was anonymous and voluntary by the students, and anyone could answer any question they wished. The undergraduate courses, Pathology I and II, through theoretical lectures (optional attendance), laboratory courses, clinicopathological workshops (mandatory attendance), and additional exam preparatory courses (optional attendance), as well as web courses (HIPON platform and Open Pathology video courses), were assessed in our study. Question 1 had five parts (a–e) and question 3 had two parts (a and b); each part was utilized as a single independent question, leading up to practically 9 questions (1a–e, 2, 3a and b, and 4) for statistical interpretation (Fig. 1). Means and standard deviation (SD) were calculated and t-test was used, with $p < 0.05$ being the level of statistical significance.

Results

Out of the 300 questionnaires given in total during both semesters, only 68 students answered in the fall semester and 115 students answered in the spring semester.

The means of the overall satisfaction of the undergraduate Pathology courses were 7.65 (SD 1.16) during the fall semester and 8.20 (SD 1.89) during the spring semester (question 1a). Regarding satisfaction with workshops, lectures, and laboratory courses, a preference for workshops in June was on average 8.31, followed by laboratory courses with 7.24 and lectures with 7.05, while in December, the preference for workshops was on average 8.20, followed by lectures with 7.46 and laboratory courses with 7.38. The additional exam preparatory courses were regarded as more interesting during the spring semester compared to the fall semester (means 8.91 and 8.53, respectively). Most of the students seemed to be more familiar with the basic pathological processes, like inflammation and neoplasia, during the spring semester (Pathology II) rather than the fall semester (Pathology I). Regarding the supplementary network courses, open e-courses were slightly more attractive to students than the HIPON platform, especially during the fall semester. It is worth noting that question 3b was evaluated by more students during the fifth semester compared to the sixth semester. The administrational support of the department (question 4) received a higher grade during the spring semester (mean value 9.24) in comparison to the fall semester (mean 8.79) (Figs. 2 and 3). With regard to the comparison between theo- retical lectures and web courses (HIPON and open e-courses), the grades were higher for the web/e- courses than for the theoretical ones, and as in June their means were 7.58 and 7.92 versus 7.05, respec- tively. The same is true for December, with means 7.66 and 8.19 versus 7.46, respectively. The differ- ence between e-courses and conventional lectures is statistically significant, in both June ($p = 0.0334$) and December ($p = 0.00005$). On the other hand, the difference between HIPON and conventional lectures was not proved to be statistically significant (in June $p = 0.22611$ and in December $p = 0.62944$). The difference between workshops and laboratory courses/lectures was statistically significant ($p < 0.003$ in favor of workshops), while that between

Questionnaire Sample

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EVALUATION OF UNDERGRADUATE TRAINING IN PATHOLOGY DURING THE ACADEMIC YEAR 2017-2018

Student's name (the inscription is not obligatory)

.....
.....

Please fill in all or any fields you wish and hand it in to the Secretariat.

1. During the 5th semester of your studies and in the course of Pathology, effort was made to coordinate and balance traditional training (ex cathedra theory) and empirical training (laboratory exercises, clinicopathological courses, additional courses, electronic training tools).
a. Rate the **overall final** result as far as the education you received (0 for totally unsatisfactory, up to 10 exceptional):
Assess separately using the same range and as a whole,
b. the "ex cathedra" theoretical lectures (if you have attended a sufficient number of them):.....
c. the laboratory exercises: .....
d. the clinicopathological courses: .....
e. the additional courses: (if you have attended them):

2. As long as you have actively participated in the training process, how familiar do you feel with the identification of fundamental pathological lesions (e.g. necrosis, inflammation, neoplasia)?
[Rate from 0 (totally unfamiliar), up to 10 (totally familiar)]:.....

3. How do you evaluate the supplementary network training tools (as detailed below) you had at your disposal?
[Rate from 0 (totally unsatisfactory), up to 10 (exceptional)]:.....
a. Platform HIPON....
b. Open training courses of NKUA (National and Kapodistrian University of Athens) .....

4. How do you evaluate the administrational support of training at the First Department of Pathology in general (e.g. availability, service, timely informative announcements)
[Rate from 0 (totally unsatisfactory), up to 10 (exceptional)]:.....

5. If you have singled out one or more members of the training staff for their overall training performance, please **state** their **names**. Evaluate among others the effort made by every member of the Teaching and Research Stuff to raise your interest in Pathology, to present the concepts of the lesson in a simple manner using examples, to encourage you to ask questions as well as the effectiveness in answering your questions and the accessibility of your professor. In case of more than one members of the Teaching and Research Stuff list the names in merit order, starting with the one you consider as the most capable member.

6. Propose, if you wish, ways of **improving** the teaching of Pathology and the overall educational performance of the First Department of Pathology.

Figure 1. The questionnaire sample.

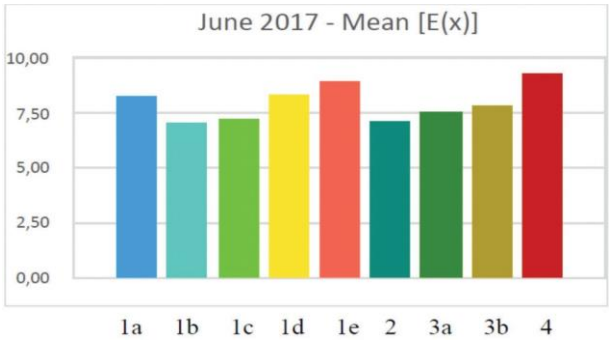

Figure 2. Mean values of the grades in the questionnaire of June 2017.

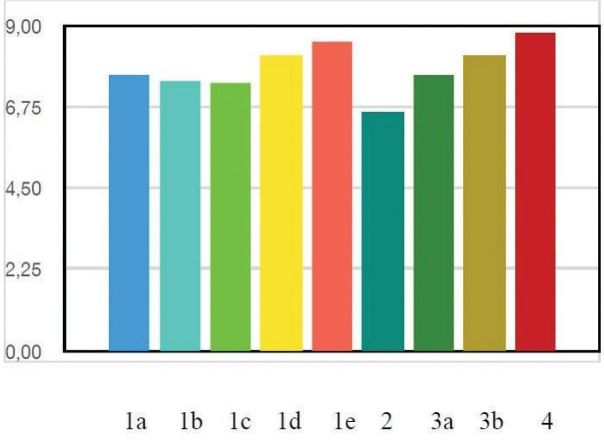

Figure 3. Mean values of the grades in the questionnaire of December 2017.

laboratory courses and lectures was not (in June p= 0.561 and in December p = 0.665).

The comparison between web/e-courses (questions 3a and b, respectively) and lectures (conven- tional learning) concluded the following: "HIPON" platform and e-courses yielded the lowest number of responses to the questions. For web/e-courses in the spring semester, the percentage of responses was 48% and 57%, respectively, versus 82% for conventional lectures (question 1b). In the fall semester, the percentage of responses was 63% for both, versus 77% for conventional lectures.

Discussion

In 1984, David Kolb introduced his own theory of experiential learning and proposed a model called the learning cycle. According to Kolb, "learning is a process in which knowledge is created through the transformation of experience". Every education is retraining, thus the cycle can be regarded as a periodically repeated process [4,5]. Experiential learning, in theory and in practice, provides participants with rich and often unprecedented experiences, which, according to most researchers, are related to the emotional phenomenon [6].

The prospect to transmit knowledge in Pathology by correlating pathological patterns of tissues with underlying mechanisms of diseases and clinical data through a web-based environment, taking advantage of modern image technology, is challenging and is not widely attempted by educators in Pathology [1]. However, medical students seem to be attracted by modern pedagogical methods, like web courses and electronic platforms. This is depicted by the difference between web/e-courses and theoretical ones in our study.

Despite the low percentage of the answered questionnaires, the evaluation of the undergraduate Pathology curriculum shows that education through clinicopathological courses is seen by stu- dents as particularly interesting. Additional courses correlating histopathology–pathophysiology and clinical diseases should be regarded as an integral part in the Pathology education [7]. For this reason, a variety of methods should be implemented, with web-based platforms becoming an increasingly useful tool in the learning process.

The questionnaire analysis revealed that, although the means of values were higher for the web/e-courses compared to theoretical lectures, the HIPON platform was a slightly less attractive networking option compared to e-courses. Furthermore, the low percentage of answers for questions concerning web/e-courses indicates a possible reluctance in the wide use as well as in the evaluation of these methods of learning by the students. It seems that at present, teaching with the tutor's physical presence is still considered to be superior, as students are hesitating to regard web courses as the basic method of training, deeming it inferior to the physical presence of the instructor. This may be attributed to the stable and traditional teacher-based consideration of education compared to newer web-based methodologies. Additionally, students may regard web courses to be of less value during the exam periods, in contrast to the exam preparatory courses with teacher's physical presence. The additional exam preparatory courses received exceptional ratings in both semesters (8.53 in December and 8.91 in June). The difference may be related to the improvement in non-compulsory course

attendance by the students as they proceed to their studies, especially when they are in the pre-clinical and clinical stages of their education. This may also explain the better familiarization with pathological and medical conditions during the spring semester compared to the fall semester. In general, the percentage of students who participated in the evaluation of Pathology courses was low but appeared to be higher in June than in December for 7 out of 9 questions. This may be attributed to the fact that students often fail to attend non-compulsory courses in the fifth semester; on the contrary, they appeared to be more satisfied in the sixth semester, attending the non-compulsory courses more frequently. Another reason is that during the spring semester, clinicopathological workshops are taught, the attendance of which was compulsory. At the clinicopathological workshops, clinical data are correlated with pathological alterations through the analysis of patient histories. It is of interest that the clinicopathological workshops were considered as the most valuable educational method, since pathology for medical students should bridge basic science with clinical practice in an experiential context. On the other hand, the slightly higher mean values in the fall semester for theoretical lectures, as well as the laboratory courses, may show that these methods are probably regarded by the students as best for an introduction to Pathology.

The unwillingness to respond to the evaluation process probably reflects the students' belief that it is not up to them to change the overall educational system, although these changes are the responsibility of the educators as well. The interest in the educational process should be mutual; when the teachers really care, the students are willing to respond. As a result, the academic teacher should give their educational duties the priority that their position requires, as their presence is crucial in students' motivation. Since reluctance in using online sources by students was noted in our study, additional efforts should be made in order to broaden the usage of such educational methods in the undergraduate Pathology curriculum. The detailed presentation of pathological conditions through high-quality clinical and pathological web images based on clinicopathological scenarios, as well as the wide use of virtual lectures and supplementary e-courses, may be some of the strategies for increasing students' motivation regarding web-based medical education. Above all else, the superiority of interactive courses combined with the teacher's physical presence is evident, and e-tools serve as a complement, not as a substitute, to the teacher's presence. Theoretical lectures are necessary to build and organize scientific thoughts, whereas practical dexterities are crucial for vocational training.

Conflict of interest

The authors declare that they have no conflict of interest.

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